



# Extron Electronics

INTERFACING, SWITCHING AND DISTRIBUTION

## User's Manual



### *MSW 4V rs and MSW 4SV rs Series* Mini Video Switchers

68-1267-01 Rev. A  
09 06



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# Precautions

## Safety Instructions • English



This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.



This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

### Caution

**Read Instructions** • Read and understand all safety and operating instructions before using the equipment.

**Retain Instructions** • The safety instructions should be kept for future reference.

**Follow Warnings** • Follow all warnings and instructions marked on the equipment or in the user information.

**Avoid Attachments** • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

## Consignes de Sécurité • Français



Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).



Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

### Attention

**Lire les instructions** • Prendre connaissance de toutes les consignes de sécurité et d'électrocution avant d'utiliser le matériel.

**Conserver les instructions** • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avance.

**Respecter les avertissements** • Observer tous les avertissements et consignes marqués sur le matériel ou présents dans la documentation utilisateur.

**Eviter les pièces de fixation** • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

## Sicherheitsanleitungen • Deutsch



Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.



Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

### Achtung

**Lesen der Anleitungen** • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.

**Aufbewahren der Anleitungen** • Alle Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

**Befolgen der Warnhinweise** • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

**Keine Zusatzeräge** • Verwenden Sie keine Werkzeuge oder Zusatzeräge, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

## Instrucciones de seguridad • Español



Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (el cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.



Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

### Precaución

**Leer las instrucciones** • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

**Consever las instrucciones** • Conservar las instrucciones de seguridad para futura consulta.

**Obedecer las advertencias** • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

**Evitar el uso de accesorios** • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

## Warning

**Power sources** • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

**Power disconnection** • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

**Power cord protection** • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed near or against them.

**Servicing** • All servicing to this equipment should be performed by qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

**Slots and openings** • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

**Lithium battery** • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

## Avertissement

**Alimentation** • Ne faire fonctionner ce matériel qu'avec une source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayer pas de contourner ni de désactiver ce dispositif.

**Déconnection de l'alimentation** • Pour déconnecter de l'énergie l'appareil, déconnecter tous les câbles d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

**Protection du cordon d'alimentation** • Acheminer les câbles d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pinçés par des objets.

**Réparation-maintenance** • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à des tensions et autres dangers.

**Fentes et orifices** • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent pas être bouchées par des objets.

**Lithium Batterie** • Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacez uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

## Vorsicht

**Stromquellen** • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

**Stromabtrennung** • Wenn Sie das Gerät vom Stromnetz trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

**Schutz des Netzkabels** • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegen gestellt werden können.

**Wartung** • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder anderer Gefahren bestehen.

**Schlitze und Öffnungen** • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der elektronischen Teile im Inneren. Die Öffnungen müssen stets frei und ungeblendet bleiben.

**Lithium-Batterie** • Ein Verbrauchte Batterie, falls die Batterie nicht richtig ersetzt wird. Erstsetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

## Advertencia

**Alimentación eléctrica** • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentear ni eliminar.

**Desconexión de alimentación eléctrica** • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

**Protección de los cables de alimentación** • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

**Reparaciones/mantenimiento** • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución no intentar personalmente la reparación/ mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

**Ranuras y aberturas** • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

**Batería de litio** • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Descharar las baterías usadas siguiendo las instrucciones del fabricante.

# FCC Class A Notice

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

## Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

### USA, Canada, South America, and Central America:

Extron Electronics  
1001 East Ball Road  
Anaheim, CA 92805, USA

### Europe, Africa, and the Middle East:

Extron Electronics, Europe  
Beeldschermweg 6C  
3821 AH Amersfoort  
The Netherlands

### Japan:

Extron Electronics, Japan  
Kyodo Building  
16 Ichibancho  
Chiyoda-ku, Tokyo 102-0082

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

*If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.*

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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## 安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

### 注意

**阅读说明书** • 用户使用该设备前必须阅读并理解所有安全和使用说明。

**保存说明书** • 用户应保存安全说明书以备将来使用。

**遵守警告** • 用户应遵守产品和用户指南上的所有安全和操作说明。

**避免追加** • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

### 警告

**电源** • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。第三条线（地线）是安全设施，不能不用或跳过。

**拔掉电源** • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

**电源线保护** • 妥善布线，避免被踩踏，或重物挤压。

**维护** • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

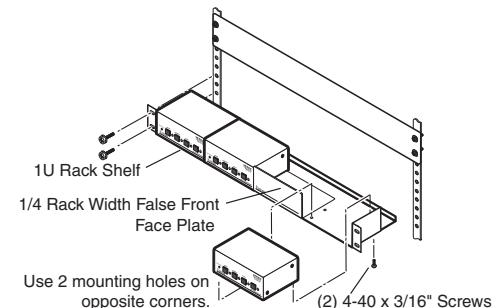
**通风孔** • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。不要用任何东西挡住通风孔。

**锂电池** • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂家的建议处理废弃电池。

## Installation

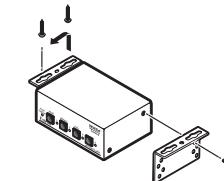
### Step 1

Turn all of the equipment off and disconnect it from the power source.



### Step 2

Select your mounting option, install the appropriate brackets and mount the MSW. Otherwise, install the four rubber feet (included) and place the mini video switcher on a desktop.



### Step 3

Connect the video input cable(s). Using video inputs 1 through 4, connect video inputs to the MSW using the connectors (BNC or 4-pin mini DIN) and signal type (composite or S-video) appropriate for your model. See "Rear Panel Connections" in chapter 2, "Installation and Operation".

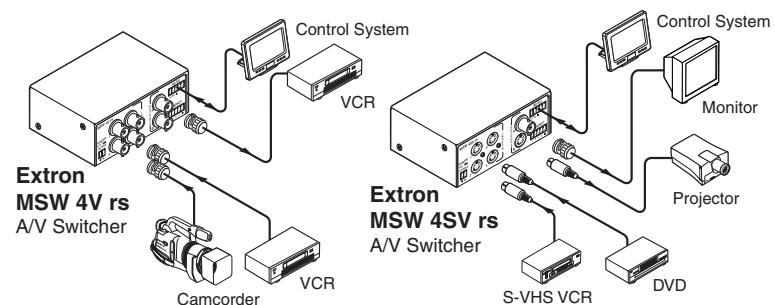
### Step 4

Attach the video output cable(s). Connect up to two video output devices to the MSW using the connectors (BNC or 4-pin mini DIN) and signal type (composite or S-video) appropriate for your model.

**NOTE** Outputs A and B output an identical signal.

### Step 5

If the MSW is to be connected to a computer or host controller for remote control, connect the host's RS-232 cable to the provided 5-pole captive screw connector, then connect it to the RS-232 port on the mini video switcher (see the serial port pinout on page 2-6).



### Step 6

Power up the input and output devices, then connect power to the MSW. Turn on the mini video switcher by connecting the external power supply. See the appropriate chapters in this manual for further details.

## Operation — Connecting an input to the output

### Step 1

Determine the necessary operation mode for the MSW (the default is normal). Choose **Autoswitch** (③) to automatically switch to the highest numbered input with active sync pulses. Choose **Normal** (④) to manually change the input. For details on how to change modes, see "Mode selection" in chapter 2, "Installation and Operation".

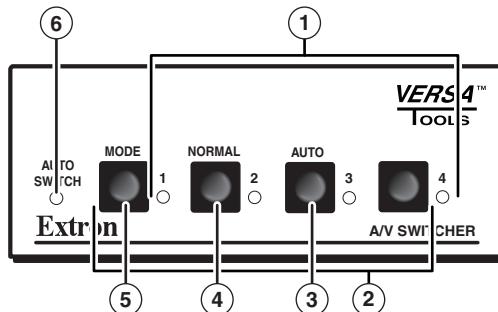
### Step 2

- If using **normal** mode, choose the desired input by pressing and releasing its input button (②). The LED (①) for the selected input lights. To switch to a different input, press a different input button.
- If using **autoswitch** mode, no action is necessary. The mini video switcher automatically switches to the highest-numbered active input.

**NOTE** Outputs A and B output an identical signal.

### Step 3

If needed, you can create a remote connection via an RS-232 device (see chapter 3, "Serial Communication").



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## MSW 4V rs and 4SV rs

# 1

## Chapter One

### Introduction

[About this Manual](#)

[Features](#)

*All trademarks mentioned in this manual are the properties of their respective owners.*

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## About this Manual

The Extron MSW 4V rs and MSW 4SV rs are four-input, two parallel output, mini video switchers (MSWs). The MSWs are members of the Extron VersaTools® line of basic distribution amplifiers, switchers, and associated video accessories.

The **MSW 4V rs** switches among up to four NTSC, PAL, or SECAM composite video inputs on female BNC connectors, and outputs two identical buffered composite video outputs on female BNC connectors (figure 1-1).

The **MSW 4SV rs** switches four S-video (luminance [Y] and chrominance [C]) inputs on 4-pin mini DIN connectors. The selected S-video input is split, buffered, and output on 2 connectors (figure 1-2):

- One S-video output on a 4-pin mini DIN connector
- One composite video output on a female BNC connector

These mini video switchers can be operated from the front panel or via a contact closure device connected to the rear panel, such as an Extron CCR 204 contact closure remote (Extron part #60-797-02) or an IR 102 Remote Control Kit (part #70-224-01).

The MSW series include RS-232 communication, allowing control via Extron's Simple Instruction Set (SIS)™ or the Universal Switcher Control Program software.

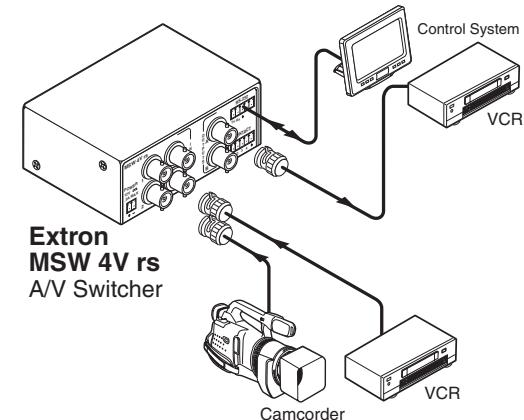
They also feature a front panel selectable autoswitch mode that automatically switches to the highest numbered input with active sync pulses present.

All units ship with an external 12 VDC power supply.

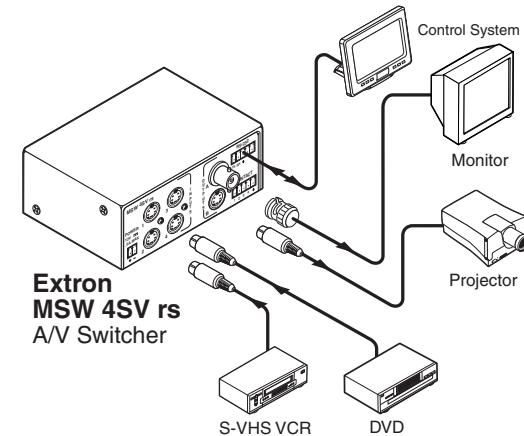
## Features

- Inputs: four female 4-pin mini DIN connectors for S-video; four female BNC connectors for composite video
- Outputs: one BNC and one 4-pin mini DIN for S-video; two BNC connectors for composite video. Both models feature two parallel outputs for simultaneous monitor and projector viewing.
- An RS-232 port for serial control
- Compatibility with NTSC, PAL, and SECAM video formats
- Retention of unit settings after power loss
- Flash upgradeable firmware
- Downloadable firmware updates

- Contact closure remote control
- Ability to detect an active signal
- Built-in video encoder to output composite video to a monitor (MSW 4SV rs model only)
- Autoswitching capabilities
- Vertical interval switching to ensure glitch-free transitions
- 1U, quarter rack width metal enclosure
- External international power supply (part #70-055-01)



**Figure 1-1 — Typical setup for the MSW 4V rs mini video switcher**



**Figure 1-2 — Typical setup for the MSW 4SV rs mini video switcher**



# **Chapter Two**

## **Installation and Operation**

Installation

Rear Panel Connections

Front Panel Controls and Indicators

Vertical Interval Switching

# Installation and Operation

## Installation

The 1U high, quarter rack width, MSW 4V rs and MSW 4SV rs can be mounted on a rack shelf, under a desk, or on a tabletop.

### Rack mounting

For optional rack mounting, mount the MSW on any of the following rack shelves:

- RSF 123 1U 3.5" Versatools® Rack Shelf Kit (part #60-190-20) (figure 2-1)
- RSB 123 1U 3.5" Versatools Basic Rack Shelf (part #60-604-20)
- RSU 126 1U 6" Universal Rack Shelf Kit (part #60-190-10)
- RSB 126 1U 6" Basic Rack Shelf (part #60-604-10)
- RSU 129 1U 9.5" Universal Rack Shelf Kit (part #60-190-01) (figure 2-2)
- RSB 129 1U 9.5" Basic Rack Shelf (part #60-604-01)

### UL requirements

The following Underwriters Laboratories (UL) requirements pertain to the safe installation of the MSW on a rack.

1. Elevated operating ambient temperature — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the MSW in an environment compatible with the maximum ambient temperature ( $T_{ma} = +122^{\circ}\text{F}, +50^{\circ}\text{C}$ ) specified by Extron.
2. Reduced air flow — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. Mechanical loading — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. Circuit overloading — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable earthing (grounding) — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

### Mounting instructions

On the standard rack shelf, the MSW mounts in one of four locations to the rear of the rack or in one of four locations to the front of the rack.

1. If they are installed, remove the feet from the bottom of the MSW.
2. Mount the MSW on the rack shelf, using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the MSW to the shelf.
3. Install blank panel(s) or other unit(s) to the rack shelf.

**NOTE** Only products in the VersaTools line can be mounted to a VersaTools shelf. Most 1U rack-mountable Extron products can be mounted on the standard shelf.

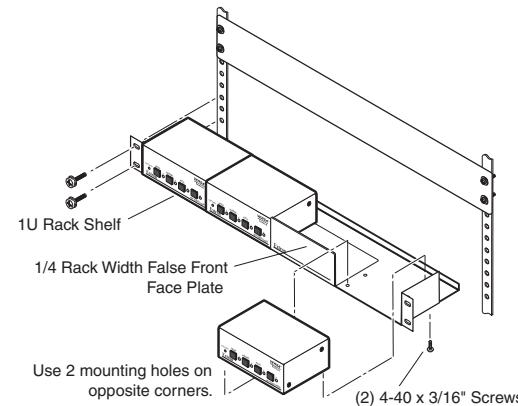


Figure 2-1 — MSW mounted on a VersaTools rack shelf

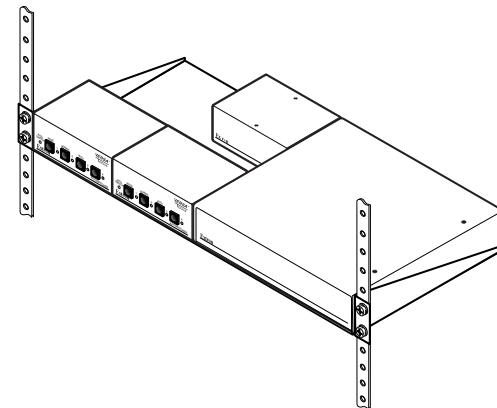
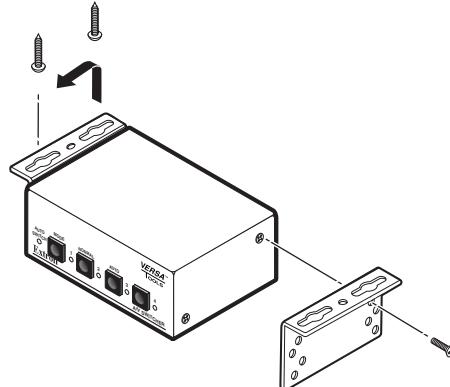


Figure 2-2 — MSW mounted on a standard rack shelf

### Furniture mounting

Furniture mount the MSW using the optional MBU 123 VersaTools under-desk mounting kit (part #70-212-01) as follows:

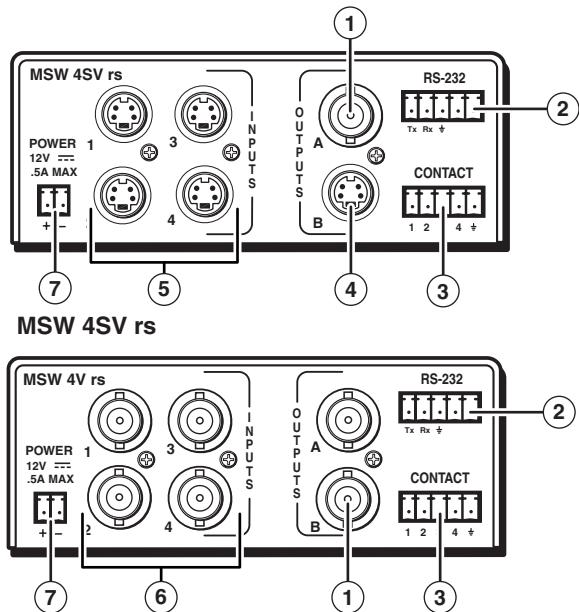
1. If necessary, remove the feet from the bottom of the MSW.
2. Attach the mounting brackets to the MSW with the provided machine screws (figure 2-3).



**Figure 2-3 — Furniture mounting the MSW**

3. Hold the MSW with the attached brackets against the underside of the table or other furniture. Mark the location of the screw holes of the bracket on the mounting surface.
4. Drill four 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
5. Insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" of the screw head protrudes.
6. Align the mounting screws with the slots in the brackets and place the MSW against the surface, fitting the screws through the bracket slots.
7. Slide the switcher slightly forward or back, then tighten all four screws to secure the MSW in place.

### Rear Panel Connections



**Figure 2-4 — MSW 4SV rs and MSW 4V rs rear panel**

**NOTE** The MSW switches on the vertical interval of input 1. For seamless switching, ensure one of the genlocked devices is connected to input 1. See "Vertical Interval Switching", later in this chapter.

**1** **Composite video Output(s) (both switcher models)** — For each composite video output, connect a composite video display or other output device to this BNC connector.

**NOTE** Outputs A and B output an identical signal.

**NOTE** The MSW 4SV has a built-in encoder; however, you can use both outputs simultaneously.

**2** **RS-232 connector** — Connect a cable with a 3.5 mm, 5-pole captive screw connector to this port for bidirectional RS-232 communication. Wire the connectors as shown on the following page.

## Installation and Operation, cont'd

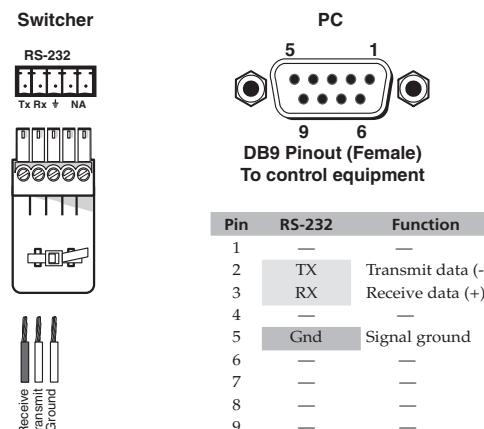


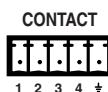
Figure 2-5 — RS-232 connector wiring

This port has the following RS-232 protocol:

- 9600 baud
- 1 stop bit
- No parity
- 8 data bits

See chapter 3, "Serial Communication", for Simple Instruction Set (SIS) commands to communicate with the MSW mini video switcher via RS-232.

③ **Contact connector** — Connect a remote contact closure device to the MSW for remote control of the switcher, or daisy chain the unit to other MSWs for remote control of the other switchers, via this 5-pin captive screw connector.



**NOTE** *The switcher must be in normal (manual) mode for contact closure to work. See "Mode selection", later in this chapter.*

To select an input using a contact closure device, such as an Extron CCR 204 contact closure remote control (part #60-794-02) or a locally constructed device, momentarily short the pin for the desired input number to logic ground (pin 5). To force one of the inputs to be always selected, leave the short in place. The short overrides any front panel input selections.

You can also daisy chain multiple MSWs via the Contact connector for front panel control of all switchers; touch the input button on one MSW to switch all MSWs. Wire pin 1 to pin 1, pin 2 to pin 2, and so on.

④ **S-video output (MSW 4SV rs)** — Connect an S-video display or other device to this 4-pin mini DIN connector for the S-video output.

⑤ **S-video Inputs 1 through 4 (MSW 4SV rs)** — For each input, connect an S-video source to one of these 4-pin mini DIN connectors.

⑥ **Composite video Inputs 1 through 4 (MSW 4V rs)** — For each input, connect a composite video source to one of these BNC connectors.

⑦ **Power connector** — Plug the external 12 VDC power supply into this 2-pin, 3.5 mm captive screw connector. The power supply is included with the unit.

In the event that power is disconnected from the MSW, the unit retains mode and input settings.

**NOTE** *The power connector on the rear panel is orange; however, the plug for the power cord may be either orange or blue. Either color plug can be connected to the rear panel receptacle.*

To wire the connector, do the following:

1. Cut the DC output cord to the length needed.
2. Strip the jacket to expose 0.2" (5 mm) of the conductors for the **blue** captive screw plug, or 0.3" (7 mm) for the **orange** plug.

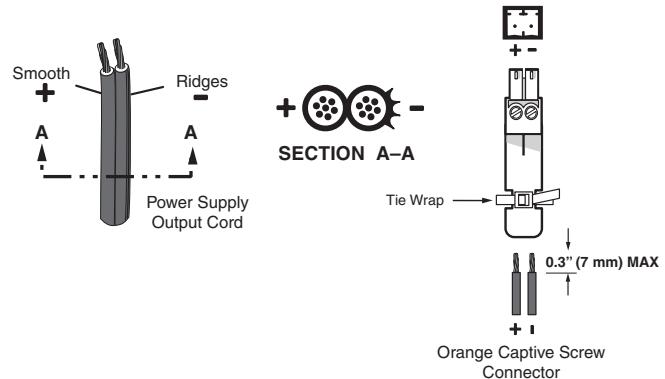


Figure 2-6 — Power wiring

**WARNING** *Exposing more than the amount of wire described above could allow the stripped wires to touch each other, causing a short circuit. This could result in the external DC power supply overheating and/or burning.*

## Installation and Operation, cont'd

**NOTE** Stripping the wires to expose less than the recommended amount causes them to slide out of the connector too easily, even if they are tightly pinched by the captive screws.

3. Slide the leads into the supplied captive screw plug and lock them, using an Extron Tweaker (small screwdriver).
4. Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.
5. To verify the power cord's polarity before connecting it, plug in the power supply with no load and check the output with a voltmeter.

**CAUTION** Do not tin the stripped power supply leads before installing the captive screw connector. Tinned wires are not as secure in the captive screw connectors and can be easily pulled out. They may also break after being bent several times.

**WARNING** The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

Alternately, an Extron PS 123 12 VDC, 3 amp power supply, (part #60-814-01), can power up to eight MSWs or other Extron 12 VDC devices using only one AC power connector.

## Front Panel Controls and Indicators

Figure 2-7 shows the front panels of the MSW 4V rs and MSW 4SV rs.

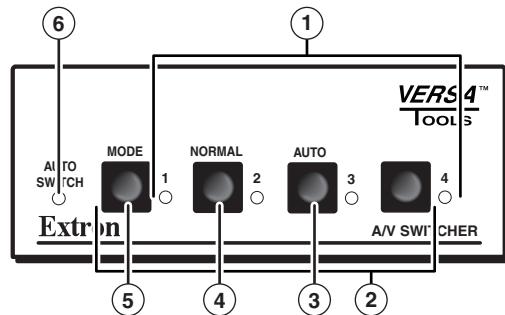


Figure 2-7 — MSW 4V rs and MSW 4SV rs front panel

### Input selection

- ① **Input 1 through 4 LEDs** — The Input LEDs identify the selected input.
- ② **Input 1 through 4 buttons** — Each Input button selects the associated input for output.

The Input 1 (⑤), Input 2 (④), and Input 3 (③) buttons are also used to toggle autoswitch mode on and off. See "Autoswitch mode controls and indicators", below.

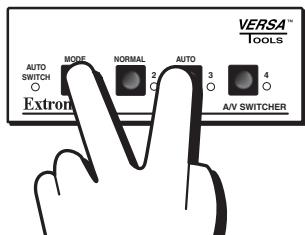
### Autoswitch mode controls and indicators

- ③ **Auto(switch) button** — The Auto button is used with the Mode button (⑤) to select the autoswitch mode. Auto is a secondary function of the Input 3 button.
- ④ **Normal button** — The Normal button is used with the Mode button (⑤) to select normal mode. Normal is a secondary function of the Input 2 button.
- ⑤ **Mode button** — The Mode button is used with the Normal button (④) or Auto button (③) to select the switching mode. Mode is a secondary function of the Input 1 button. See "Mode selection", on the following page.
- ⑥ **Auto Switch LED** — When lit, the Auto Switch LED indicates that the switcher is in autoswitch mode. In this mode, the MSW automatically switches to the highest numbered input with active sync pulses. When this LED is unlit, the switcher is in normal (manual) mode.

### Mode selection

To turn autoswitch mode **on**:

1. Press and hold the **Mode (Input 1)** button.
2. Press and hold the **Auto (Input 3)** button.
3. Release the Mode and Auto buttons simultaneously.

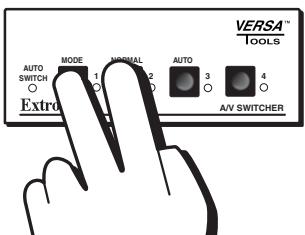


**Figure 2-8 — Turning on autoswitch mode**

The Auto Switch LED lights, indicating that autoswitch is enabled.

To turn autoswitch mode **off** (Normal mode):

1. Press and hold the **Mode (Input 1)** button.
2. Press and hold the **Normal (Input 2)** button.
3. Release the Mode and Normal buttons simultaneously.



**Figure 2-9 — Turning off autoswitch mode**

The Auto Switch LED is unlit and the MSW switches to the previously selected input.

**NOTE** *In the event that power is disconnected from the MSW, the unit retains mode and input settings.*

### Vertical Interval Switching

The MSWs switch inputs during the vertical interval of the video signal that is on input 1. In a genlocked system, switching to any input is glitch-free if one of the genlocked devices is connected to input 1.



### MSW 4V rs and 4SV rs

# 3

## Chapter Three

### Serial Communication

Using Simple Instruction Set (SIS™) Control

Windows-based Control Program

Updating the Firmware

## Using Simple Instruction Set (SIS) Control

### Host-to-switcher communications

The Extron Simple Instruction Set (SIS) commands consist of one or more characters per field. No special characters are required to begin or end a command character sequence. When a command is valid, the switcher executes the command and sends a response to the host device. All responses from the switcher to the host end with a carriage return and a line feed (CR/LF =  $\leftarrow$ ), which signals the end of the response character string. A string is one or more characters.

### Switcher-initiated messages

When a local event, such as a front panel operation or error condition, occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed below:

(c) Copyright 2006, Extron Electronics, MSW Series Switchers,  
Vx.xx $\leftarrow$

The switcher issues the copyright message and the input selected message when it first powers on. Vx.xx is the firmware version number.

Inn $\leftarrow$

The switcher sends the Inn message whenever the selected input is changed using the front panel buttons. "n" is the input number.

### Error responses

When the switcher receives a valid SIS command, it executes the command and sends a response to the host device. If the switcher is unable to execute the command because the command is invalid or it contains invalid parameters, the switcher returns an error response to the host. The error response codes are:

- E01 – Invalid input channel number (out of range)
- E06 – Invalid input channel change (auto-switch active)
- E10 – Invalid command
- E13 – Invalid parameter

### Timeout

Pauses of 10 seconds or longer between command ASCII characters result in a timeout. The command operation is aborted with no other indication.

## RS-232 communication

Wire the RS-232 connectors as shown below.

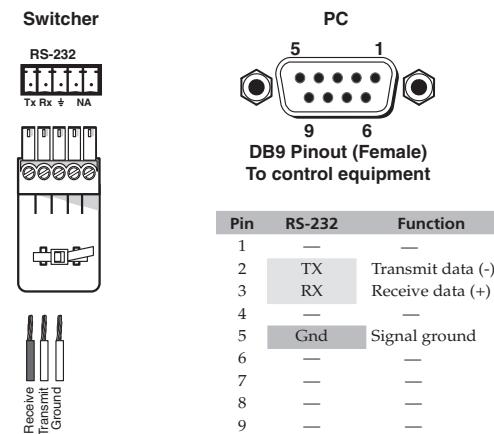


Figure 3-1 — RS-232 connector wiring

This port has the following RS-232 protocol:

- 9600 baud
- 1 stop bit
- No parity
- 8 data bits

## Serial Communication, cont'd

### Using the command/response table

The Command/response table for Simple Instruction Set (SIS) commands is shown at right. The symbols used throughout the table represent variables in the command/response fields. Lower and upper case letters are interchangeable, and command and response examples are shown throughout the table.

The ASCII to HEX conversion table, below, is for use with the command/response table.

ASCII to HEX Conversion Table									
20	!	21	"	22	#	23	\$	24	%
(	28	)	29	*	2A	+	2B	,	2C
0	30	1	31	2	32	3	33	4	34
8	38	9	39	:	3A	;	3B	<	3C
@	40	A	41	B	42	C	43	D	44
H	48	I	49	J	4A	K	4B	L	4C
P	50	Q	51	R	52	S	53	T	54
X	58	Y	59	Z	5A	[	5B	\	5C
'	60	a	61	b	62	c	63	d	64
h	68	i	69	j	6A	k	6B	l	6C
p	70	q	71	r	72	s	73	t	74
x	78	y	79	z	7A	{	7B		7C
						}		~	7D
								~	7E
								DEL	7F

### Symbol definitions

- ↖ = CR/LF (carriage return with line feed)
- = space
- ☒ = Input number (1 through 4)
- ☒ = Input signal status: 0 = no signal detected, 1 = signal detected
- ☒ = On/off status: 0 = off, 1 = on
- ☒ = Switch mode: 1 = normal, 2 = auto
- ☒ = Input number response (1 through 4)

### Command/response table for Simple Instruction Set (SIS) commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional Description
<b>Input selection</b>	☒!	In☒↓	Select input☒. For☒: input 1 through 4.
<b>Input video sensing</b>		Sig•☒•☒•☒•☒↓	Each☒ response is the signal status of an input, from input 1 to 4.☒ = 0 (no signal) or 1 (signal detected).
	Request all inputs' status	0S	Example
		Sig•1•0•0•1↓	Input 1 = signal present; input 2 = no signal present; input 3 = no signal present; input 4 = signal present.
	Request an individual input's status	☒S	☒ signal's status =☒.
<b>Video mute</b>			Video mute. For☒: 0 = off; 1 = on.
	Mute/ unmute video	☒B	Video mute status.
	Read mute status	B	
<b>Mode select</b>		F☒↓	Set to normal or autoswitch mode. For☒: 1 = normal, 2 = auto.
<b>General information</b>	I	V☒•F☒•Vm☒↓	For☒: current selected input 1-4.
	Normal/ autoswitch mode	☒#	For☒: switcher is in normal (1) or auto (2) mode.
			For☒: video mute is off (0) or on (1).
			Video is selected on input 2 (V2); switcher is in normal mode (F1); video mute is off (Vm0).
			View the firmware version.
			View the part number.
			Upload firmware.
			Resets unit to factory defaults.

### Windows-Based Control Program

The Universal Switcher Control Program (part #29-031-01), is compatible with Windows 2000 and Windows XP or later, and it provides remote control of input selection and front panel switch mode selection.

#### Installing the software

The Universal Switcher Control Program is contained on the CD included with the unit.

**NOTE** *If the installation program does not self start when the CD is loaded, run Launch.exe from the CD and follow the instructions that appear on the screen.*

If you need to reinstall the software or new software is available, download updates to this program from the Extron Web site (<http://www.extron.com>).

By default, the Windows installation creates a C:\Program Files\Extron\UnivSW folder and places a Universal Switcher Control Program icon onto the desktop.

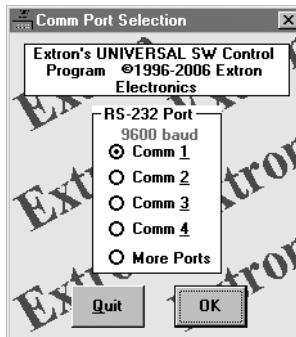
#### Using the software

1. To run the software, double-click the Universal Switcher Control Program icon on your desktop.



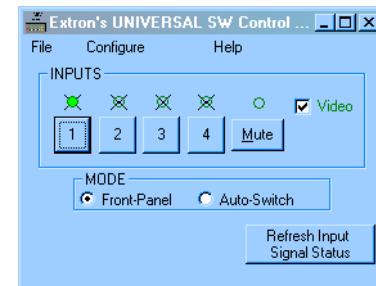
**Figure 3-2 — MSW software icon**

2. In the Comm Port Selection window (figure 3-3), click the comm port that is connected to the MSW's RS-232 port.



**Figure 3-3 — Comm port selection window**

3. The Extron Universal Switcher Control Program window (figure 3-4) displays the selected input and panel mode (Front-Panel [normal] or Auto-Switch).



**Figure 3-4 — The Universal Switcher program window**

4. Select and click the desired input button. Symbols for the state of each LED are shown below:
  - indicates that the input signal is present and is selected.
  - indicates that the input signal is present but not selected.
  - ✗ indicates that the input signal is not present and not selected.
  - ✗ indicates that an input signal is not present, but is selected.

Click the **Refresh Input Signal Status** button to refresh the input signal status.

Click the **Mute** button to suppress the video image.

The **Mode** radio buttons indicate the current mode (Front-Panel [normal] or Auto-Switch). You can also change the mode through the software by clicking the desired mode's radio button.

### Updating the Firmware

Extron periodically updates product firmware in conjunction with the release of new software revisions. When updating any Extron software to the latest revision level, please be sure to read the supplied release notes, or contact an Extron Application Engineer to determine if your Extron product requires a firmware update.

To find the latest MSW firmware, do the following:

1. Go to [www.extron.com](http://www.extron.com) and click the **Download** tab.
2. From the sidebar menu, click the **Firmware** link.
3. Find the **MSW mini video switcher** on the alphabetical list (you may need to click the "Next" arrow).
4. Click the **Download** link for the product and follow the instructions that appear on the screen.
5. Note the folder to which you save the firmware file.

**CAUTION**

*Do not interrupt the firmware upload before it is 100% complete. Interrupting the upload corrupts the firmware and the switcher will not operate properly afterwards.*

### Using the control program to update the firmware

To upload the latest firmware to the MSW using the control program, do the following:

1. Open the Universal Switcher Control Program (see the previous section, "Using the software", for instructions).
2. From the **File** menu, choose **Update Firmware**.

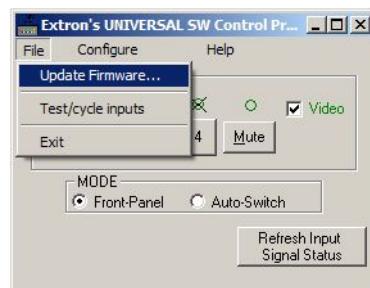


Figure 3-5 — Choosing Update Firmware

3. Click the **Browse** button.

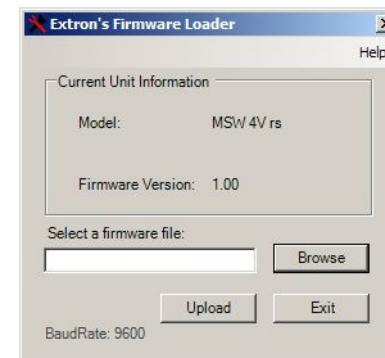


Figure 3-6 — The Firmware Loader dialog

4. The **Choose Firmware File** dialog box appears.

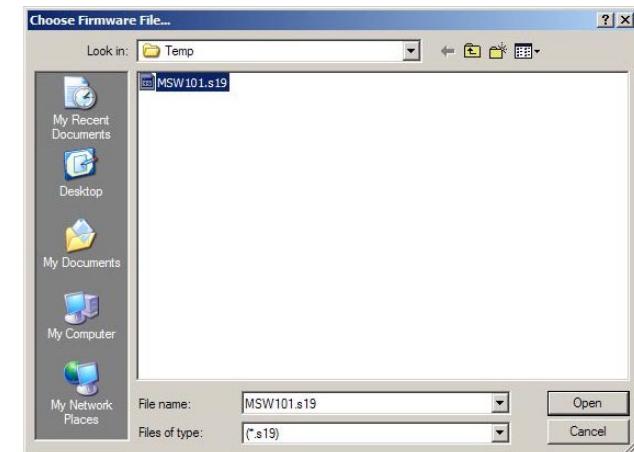


Figure 3-7 — The Choose Firmware File dialog

5. Navigate to the folder where you saved the firmware upgrade and select the file.

**NOTE** *The firmware file must have the file extension ".s19". Any other file extension is not a firmware upgrade for your switcher.*

6. Click the **Open** button. The Firmware Loader update window appears.
7. Click the **Upload** button.

## Serial Communication, cont'd

8. A status bar, showing the progress of the upload appears in the Firmware Loader window. The firmware upload to the switcher may take several minutes.

Once the status bar has progressed fully from left to right across the indicator window, the Firmware Loader utility automatically resets the switcher.

### CAUTION

*If the Firmware Loader utility exits before the status bar has progressed completely across the indicator window, the firmware may be corrupted and may no longer respond to the Universal Switcher Control Program.*

When successfully completed, the installation is confirmed with a "Transfer Complete!" message, as shown below.



**Figure 3-8 — The upload confirmation message**

9. Click the **Exit** button to exit the Firmware Loader utility.

### Using the help system

For information about program features, you can access the help program in two ways:



From within the Universal Switcher Control Program,

- Click on the Help entry on the task bar, or
- Press the F1 key.



## MSW 4V rs and 4SV rs



# Appendix A

## Specifications, Part Numbers, and Accessories

Specifications

Parts

## Specifications, Part Numbers, Accessories, cont'd

### Specifications

#### Video — MSW 4V rs, MSW 4SV rs

Gain .....	Unity
Bandwidth	
MSW 4V .....	300 MHz (-3 dB)
MSW 4SV .....	250 MHz (-3 dB)
Crosstalk .....	<-60 dB @ 3.58 MHz
Switching speed .....	20 ms (max.)

#### Video — MSW 4V SDI rs

Resolution.....	8 or 10 bits, automatic
Operation standards .....	143 Mb/s (4fsc NTSC) 177 Mb/s (4fsc PAL)
	270 Mb/s (4:2:2) component video
	360 Mb/s (4:2:2) widescreen, autoselect
Equalization and reclocking .....	Automatic for up to -30 dB of cable loss
Automatic data rate clock .....	Yes

#### Video input

Number/signal type	
MSW 4V rs .....	4 composite video
MSW 4SV rs .....	4 S-video
MSW 4V SDI rs.....	4 serial digital component video

##### Connectors

MSW 4V rs, MSW 4V SDI rs	
	4 female BNC
MSW 4SV rs .....	4 female 4-pin mini DIN

Nominal level .....	1 Vp-p for Y of S-video and for composite video
	0.3 Vp-p for C of S-video
	0.8 Vp-p for SDI

Minimum/maximum levels (MSW 4V rs, MSW 4SV rs)	
	0.4 V to 2.0 Vp-p with no offset

Impedance .....	75 ohms
-----------------	---------

##### Return loss

MSW 4SV rs .....	<-25 dB, DC @ 10 MHz
Other models .....	<-40 dB, DC @ 10 MHz

DC offset (max. allowable).....	5.0 V
---------------------------------	-------

##### Input coupling

MSW 4V rs, MSW 4SV rs ..	DC
MSW 4V SDI rs.....	AC

### Video output

Number/signal type	
MSW 4V rs .....	2 composite video
MSW 4SV rs .....	1 S-video, 1 composite video
MSW 4V SDI rs .....	2 reclocked SMPTE-259 serial digital component video
Connectors	
MSW 4V rs, MSW 4V SDI rs	2 BNC female
MSW 4SV rs .....	1 BNC female, (1) 4-pin mini DIN female
Nominal level .....	1 Vp-p for Y of S-video and for composite video
	0.3 Vp-p for C of S-video
	0.8 Vp-p for SDI
Minimum/maximum levels (MSW 4V rs, MSW 4SV rs)	0.4 V to 2.0 Vp-p
Impedance .....	75 ohms
Return loss	
MSW 4V/4SV rs .....	<-30 dB @ 5 MHz
MSW 4V SDI rs .....	<-25 dB @ 5 MHz

DC offset .....	±5 mV maximum with input at 0 offset
-----------------	--------------------------------------

Switching type (MSW 4V rs/4SV rs)	Vertical interval
-----------------------------------	-------------------

#### MSW 4V SDI rs

Jitter .....	<2 µs
Rise/fall time (20-80%)....	700 ps ±100 ps
Re-clocking .....	Automatic, bypass mode for nonstandard rates

### Sync

#### Standards

MSW 4V rs, MSW 4SV rs ..	NTSC 3.58, NTSC 4.43, PAL, SECAM
MSW 4V SDI rs .....	SMPTE-259M, SMPTE-292M

### Control/remote — switcher

Serial control port .....	1 RS-232, 3.5 mm captive screw connector, 5 pole
Baud rate and protocol .....	9600 baud, 8 data bits, 1 stop bit, no parity
Serial control pin configurations.	1 = TX, 2 = RX, 3 = GND

## Specifications, Part Numbers, and Accessories

Contact closure ..... (1) 3.5 mm captive screw connector, 5 pole

Contact closure pin configurations

1 = input 1, 2 = input 2, 3 = input 3,

4 = input 4, 5 = GND

Program control ..... Extron's Universal Switcher Program for

Windows®

Extron's Simple Instruction Set (SIS™)

### General

External power supply ..... 100 VAC to 240 VAC, 50/60 Hz, external, autoswitchable; to 12 VDC, regulated

Power input requirements

MSW 4V rs, MSW 4SV rs ..... 12 VDC, 0.2 A

MSW 4V SDI rs ..... 12 VDC, 0.4 A

Temperature/humidity ..... Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing

Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing

Rack mount ..... Yes, with optional 1U rack shelf #60-190-01 or 60-190-20; also under-furniture mountable with optional brackets #70-212-01

Enclosure type ..... Metal

Enclosure dimensions ..... 1.7" H x 4.3" W x 3.0" D  
(1U high, quarter rack wide)  
4.3 cm H x 10.9 cm W x 6.5 cm D  
(Depth excludes connectors.)

Product weight ..... 0.6 lbs (0.3 kg)

Shipping weight ..... 3 lbs (2 kg)

Vibration ..... ISTA 1A in carton  
(International Safe Transit Association)

Listings ..... UL, CUL

Compliances ..... CE, FCC Class A, VCCI, AS/NZS, ICES

MTBF ..... 30,000 hours

Warranty ..... 3 years parts and labor

**NOTE** All nominal levels are at  $\pm 10\%$ .

**NOTE** Specifications are subject to change without notice.

## Parts

### Included parts

These items are included in each order of an MSW series mini video switcher:

Included parts	Part number
MSW 4V rs or	60-480-11
MSW 4SV rs	60-480-12
12 VDC, 1A external power supply (Int'l)	70-055-01
IEC power cord	
(2) Female 3.5 mm, 5-pole captive screw connectors	10-319-10
(1) Female 3.5 mm, 2-pole captive screw connectors (orange)	10-319-15
Tweaker (small screwdriver)	
(4) Rubber feet (not attached)	
MSW 4V rs & 4SV rs Series User's Manual	

### Optional accessories

These items are optional accessories that can be used with the MSW series mini video switchers:

Accessories	Part number
CCR 204 Contact Closure Remote	60-794-02
IR 102 Remote Control Kit	70-224-01
RSF 123 1U 3.5" Versatools Rack Shelf Kit	60-190-20
RSB 123 1U 3.5" Versatools Basic Rack Shelf	60-604-20
RSB 126 1U 6" Basic Rack Shelf	60-604-10
RSU 126 1U 6" Universal Rack Shelf Kit	60-190-10
RSU 129 1U 9.5" Universal Rack Shelf Kit	60-190-01
RSB 129 1U 9.5" Deep Basic Rack Shelf	60-604-01
MBU 123 Under-Desk Mount Kit	70-212-01